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Macalester College 1997-98 Annual Energy Summary

Macalester College

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MACALESTER COLLEGE

1997-98

**ANNUAL
ENERGY SUMMARY**

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ANNUAL ENERGY SUMMARY

1997-1998

INTRODUCTION: The information contained in this booklet summarizes the energy consumption for the period of June 1, 1997 through May 31, 1998. The numbers contained herein reflect energy consumption by the central steam plant and campus electric loop; energy expenses incurred by Macalester properties not on these systems are not reflected in this report. Unless otherwise noted energy consumption figures and costs are based on actual billings from energy suppliers (Marathon-Ashland, Northern States Power Gas and Electric, Koch Refining). Throughout this summary the word "fuel" may denote either natural gas, #2 or #6 fuel oil.

YEAR IN REVIEW

At 120.632 billion btus campus fuel and electricity consumption during 1997-98 dropped by 20.248 billion btus as compared to 1996-97. (It should be noted 1996-97 was the highest recorded consumption by campus in twelve years. 1997-98 consumption figures are 3 billion btus less than four year campus average during the period of 1992-93 through 1995-96.) Total energy costs fell \$40,464 below budgeted levels through substantial savings in fuel consumption. Campus energy savings would have been higher except for the marked increase in electrical consumption.

FUEL CONSUMPTION: During 1997-98 fuel consumption totaled 82.412 billion btus which represents the second lowest consumption in the last thirteen years. At 6,689 heating degree days the past heating season was the third warmest in the past thirteen years. Fuel costs dropped three cents per hundred thousand btus as compared with last year but still exceeded budgeted levels by one cent per 100,000 btus. Reduced consumption provided savings of \$85,010 while higher fuel pricing decreased these savings by \$8,652 for net reduction of \$76,358.

Overall building by building consumption was similar to past years. Putting Olin Hall back on line increased the total campus demand by three percent for a total of twenty-seven percent for the Olin/Rice complex. New Hall accounts for an additional three percent. With the exceptionally mild winter neither of these additions were notable since there was a significant drop in total campus Btu consumption (99.9 billion btus in 1996-97 as compared to 82.4 billion in 1997-98).

ELECTRICITY: During 1997-98 electrical consumption increased nearly 800,000 KWH (2.7296 billion btus) from 11,983,679 KWh to 12,782,400 KWh or a 6.67% increase. Expenditures for electricity increased from \$559,179.31 in 1996-97 to \$613,894.36 during 1997-98. The addition of Olin Hall and New Hall caused this increase. Additionally, 37 Macalester (Veggie Co-op) and the Alumni House are now tied into the campus loop through New Hall adding their loads and expense to the campus system.

New Hall's demand for electricity in itself accounts for the total increase in electrical consumption experienced during the past year. Even when subtracting out past usage by Alumni House and 37 Macalester (which are now on the same meter) New Hall consumed approximately 950,000 KWh during 1997-98. New Hall is now the third largest consumer on campus of electricity behind Olin/Rice and DeWitt Wallace Library but ahead of the central chiller plant and Stadium (which is an all electric building--including heating). This level of consumption is alarming especially when comparing it against two of the other recently renovated resident halls. Annually New Hall electrical costs total \$1.20 per square foot as compared to annual per square foot costs of \$.46 and \$.19 for Bigelow and Kirk Halls respectively. But it should be noted New Hall contains significantly more equipment than Bigelow or Kirk. This includes higher lighting levels, univents in each suite providing ventilation, heating and air conditioning to each room, and an elevator.

SUMMARY: A mild winter assisted in adjusting fuel prices to levels comparable to 1993-94 after the significant increase experienced during 1996-97. The market has yet to drop to levels as experienced during the years 1991-1993 or 1994-95. Overall, annual campus fuel cost and consumption depends more on market conditions and weather conditions than operational changes. Over the past ten years significant operational changes have been made resulting in fuel savings but as more outside air is brought into buildings to meet either indoor air quality standards (77 Macalester) or as demanded by program (Olin/Rice) the weather will play a greater role in consumption levels. As noted above 1997-98 was the second lowest fuel consumption year in the past thirteen years even though the central plant is heating an additional 200,000 square feet. This is due to the third lowest number of heating degree days, increased electrical use and more efficient heating operations.

Electricity consumption continues to increase as buildings are renovated and built. Equipment levels (whether HVAC, program, computers, lighting, etc.) are always higher on new and renovated buildings. These higher equipment demands do two things; first, fuel requirements drop due to the heat given off by this equipment and second, overall campus utility bills increase because the campus is trading inexpensive energy (fuel) for higher priced energy (electricity). This suggests as a campus community Macalester needs to focus on reducing electrical consumption to realize the greatest economic savings.

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1997-98 FUEL & ELECTRICITY CONSUMPTION

		JUN	JUL	AUG	SEP
GAS	QUANTITY-CCF	0	0	0	0
	COST-\$	\$288.75	\$288.76	\$288.75	\$288.75
	UNIT COST	0	0	0	0
	CCF BTUS(X1000)	0	0	0	0
#2 FUEL OIL	QUANTITY-GAL	0	0	0	0
	COST-\$	\$0.00	\$0.00	\$0.00	\$0.00
	UNIT COST	0.0000	0.0000	0.0000	0.0000
#6 FUEL OIL	QUANTITY-GAL	0	0	0	0
	COST-\$	\$0.00	\$0.00	\$0.00	\$0.00
	UNIT COST	0.0000	0.0000	0.0000	0.0000
	OIL BTUS(X1000)	0	0	0	0
TOTAL HEATING BTU (X100k)	QUANTITY-BTU(x1K)	0	0	0	0
ELECTRICITY	QUANTITY-KWH	940,800	979,200	1,008,000	1,135,200
	# BILLING DAYS	29	29	31	29
	KWH PER DAY	32,441	33,766	32,516	39,145
	COST-\$	\$51,716.17	\$50,880.21	\$52,281.52	\$64,303.48
	UNIT COST	0.055	0.052	0.052	0.057
	QUANTITY KW	2,232	2,280	2,040	2,592
	COST-\$	\$18,547.92	\$18,946.80	\$16,952.40	\$21,539.52
	BTUS(X1000)	3,210,010	3,341,030	3,439,296	3,873,302
<u>TOTAL CAMPUS BTU CONSUMPTION X 10MIL</u>		<u>321</u>	<u>334</u>	<u>344</u>	<u>387</u>
# STEAM GENERATED		0	0	0	0
BOILER EFFICIENCY (BTU STEAM/BTU FUE		0.0%	0.0%	0.0%	0.0%
HEATING DEGREE DAY - ACTUAL (MAC)		10	21	29	97
COOLING DEGREE DAY - ACTUAL (MAC)		192	215	131	34
Chiller - New Central Plant		513	519	519	328
Run - Old Central Plant		0	0	0	0
Times - Chapel		269	349	274	266

1996-97 FUEL AND ELECTRICITY CONSUMPTION

		JUNE	JULY	AUGUST	SEPT.
GAS	QUANTITY-CCF	0	0	0	0
	COST-\$	\$288.75	\$288.76	\$288.75	\$288.75
	UNIT COST	0	0	0	0.193
	CCF BTUS(X1000)	0	0	0	0
#2 FUEL OIL	QUANTITY-GAL	0	0	0	0
	COST-\$	\$0.00	\$0.00	\$0.00	\$0.00
	UNIT COST	0.0000	0.0000	0.0000	0.0000
#6 FUEL OIL	QUANTITY-GAL	0	0	0	0
	COST-\$	\$0.00	\$0.00	\$0.00	\$0.00
	UNIT COST	0.0000	0.0000	0.0000	0.0000
	OIL BTUS(X1000)	0	0	0	0
TOTAL HEATING BTU (X100k)	QUANTITY-BTU(x1K)	0	0	0	0
ELECTRICITY	QUANTITY-KWH	727,680	1,204,800	691,200	1,070,400
	# BILLING DAYS	26	29	29	32
	KWH PER DAY	27,988	41,545	23,834	33,450
	COST-\$	\$36,089.46	\$55,056.45	\$46,912.74	\$56,136.57
	UNIT COST	0.050	0.046	0.068	0.052
	QUANTITY KW	2,064	2,136	2,184	2,280
	COST-\$	\$13,721.47	\$17,158.48	\$18,149.04	\$18,946.80
	BTUS(X1000)	2,482,844	4,110,778	2,358,374	3,652,205
<u>TOTAL CAMPUS BTU CONSUMPTION X 10MIL</u>		<u>248</u>	<u>411</u>	<u>236</u>	<u>590</u>
# STEAM GENERATED		0	0	0	1,091,900
BOILER EFFICIENCY (BTU STEAM/BTU FUE		0.0%	0.0%	0.0%	50.0%
HEATING DEGREE DAY - ACTUAL (MAC)		30	0	0	123
COOLING DEGREE DAY - ACTUAL (MAC)		306	328	334	101
Chiller - New Central Plant		0	0	0	0
Run - Old Central Plant		484	713	744	231
Times - Chapel		222	317.1	324.3	121.25

1997-98 FUEL & ELECTRICITY CONSUMPTION

		OCT	NOV	DEC	JAN
GAS	QUANTITY-CCF	60,580	137,627	147,676	144,549
	COST-\$	\$20,555.82	\$45,722.06	\$38,797.91	\$35,106.45
	UNIT COST	0.339	0.332	0.263	0.243
	CCF BTUS(X1000)	6,058,000	13,762,700	14,767,600	14,454,900
#2 FUEL OIL	QUANTITY-GAL	0	0	0	0
	COST-\$	\$0.00	\$0.00	\$0.00	\$0.00
	UNIT COST	0.0000	\$0.00	0.0000	0.0000
#6 FUEL OIL	QUANTITY-GAL	0	204	0	9,042
	COST-\$	\$0.00	\$128.89	\$0.00	\$2,678.24
	UNIT COST	0.0000	0.6318	0.0000	0.2962
	OIL BTUS(X1000)	0	30,600	0	1,356,300
TOTAL HEATING BTU (X100k)	QUANTITY-BTU(x1K)	6,058,000	13,793,300	14,767,600	15,811,200
ELECTRICITY	QUANTITY-KWH	1,144,800	1,096,800	1,195,200	936,000
	# BILLING DAYS	29	30	35	32
	KWH PER DAY	39,476	36,560	34,149	29,250
	COST-\$	\$56,190.32	\$49,899.49	\$50,752.79	\$42,517.47
	UNIT COST	0.049	0.045	0.042	0.045
	QUANTITY KW	2,952	2,256	2,040	1,872
	COST-\$	\$14,670.72	\$12,768.96	\$11,546.40	\$10,595.52
	BTUS(X1000)	3,906,058	3,742,282	4,078,022	3,193,632
TOTAL CAMPUS BTU CONSUMPTION X 10MIL		996	1,754	1,885	1,900
# STEAM GENERATED		6,406,000	12,622,100	12,779,300	14,523,200
BOILER EFFICIENCY (BTU STEAM/BTU FUE		91.8%	80.9%	81.8%	82.8%
HEATING DEGREE DAY - ACTUAL (MAC)		465	1,068	1,160	1,338
COOLING DEGREE DAY - ACTUAL (MAC)		27	0	0	0
Chiller - New Central Plant		169	0	0	0
Run - Old Central Plant		0	0	0	0
Times - Chapel		103	0	0	0

1996-97 FUEL AND ELECTRICITY CONSUMPTION

		OCT.	NOV.	DEC.	JAN.
GAS	QUANTITY-CCF	81,367	126,255	16,118	98,509
	COST-\$	\$18,560.04	\$37,777.07	\$6,646.08	\$39,381.01
	UNIT COST	0.199	0.213	0.256	0.400
	CCF BTUS(X1000)	8,136,700	12,625,500	1,611,800	9,850,900
#2 FUEL OIL	QUANTITY-GAL	0	0	7,503	0
	COST-\$	\$0.00	\$0.00	\$5,605.12	\$0.00
	UNIT COST	0.0000	0.0000	0.7471	0.0000
#6 FUEL OIL	QUANTITY-GAL	0	16,706	97,039	58,144
	COST-\$	\$0.00	\$7,259.55	\$44,298.33	\$36,738.05
	UNIT COST	0.0000	0.4345	0.4565	0.6318
	OIL BTUS(X1000)	0	2,505,900	15,598,767	8,721,600
TOTAL HEATING BTU (X100k)	QUANTITY-BTU(x1K)	8,136,700	15,131,400	17,210,567	18,572,500
ELECTRICITY	QUANTITY-KWH	960,000	998,400	1,039,898	1,074,562
	# BILLING DAYS	29	31	31	31
	KWH PER DAY	33,103	32,206	33,545	34,663
	COST-\$	\$44,123.59	\$45,668.97	\$44,214.67	\$45,688.50
	UNIT COST	0.046	0.046	0.043	0.043
	QUANTITY KW	1,968	2,112	1,968	1,968
	COST-\$	\$11,138.88	\$11,953.92	\$11,510.17	\$11,510.17
	BTUS(X1000)	3,275,520	3,406,541	3,548,132	3,666,406
TOTAL CAMPUS BTU CONSUMPTION X 10MIL		1,046	1,841	2,071	2,224
# STEAM GENERATED		5,745,600	11,988,600	14,582,600	16,082,800
BOILER EFFICIENCY (BTU STEAM/BTU FUE		75.0%	80.0%	79.9%	78.0%
HEATING DEGREE DAY - ACTUAL (MAC)		438	1,100	1,399	1,502
COOLING DEGREE DAY - ACTUAL (MAC)		8	0	0	0
Chiller - New Central Plant		0	0	0	0
Run - Old Central Plant		0	0	0	0
Times - Chapel		0	0	0	0

1997-98 FUEL & ELECTRICITY CONSUMPTION

		FEB	MAR	APR	MAY
GAS	QUANTITY-CCF	110,568	126,506	66,498	16,255
	COST-\$	\$26,520.32	\$31,884.38	\$16,972.00	\$4,120.46
	UNIT COST	0.240	0.252	0.255	0.253
	CCF BTUS(X1000)	11,056,800	12,650,600	6,649,800	1,625,500
#2 FUEL OIL	QUANTITY-GAL	0	0	0	0
	COST-\$	\$0.00	\$0.00	\$0.00	\$0.00
	UNIT COST	0.0000	0.0000	0.0000	0.0000
#6 FUEL OIL	QUANTITY-GAL	0	0	0	0
	COST-\$	\$0.00	\$0.00	\$0.00	\$0.00
	UNIT COST	0.0000	0.0000	0.0000	0.0000
	OIL BTUS(X1000)	0	0	0	0
TOTAL HEATING BTU (X100k)	QUANTITY-BTU(x1K)	11,056,800	12,650,600	6,649,800	1,625,500
ELECTRICITY	QUANTITY-KWH	1,034,400	1,161,600	1,039,200	1,111,200
	# BILLING DAYS	29	34	30	32
	KWH PER DAY	35,669	34,165	34,640	34,725
	COST-\$	\$46,017.20	\$48,439.02	\$48,518.00	\$52,378.32
	UNIT COST	0.044	0.042	0.047	0.047
	QUANTITY KW	1,992	2,016	2,208	2,328
	COST-\$	\$11,274.72	\$11,410.56	\$12,497.00	\$13,176.48
	BTUS(X1000)	3,529,373	3,963,379	3,545,750	3,791,414
TOTAL CAMPUS BTU CONSUMPTION X 10MIL		1,459	1,661	1,020	542
# STEAM GENERATED		10,096,600	11,673,700	6,897,100	2,545,500
BOILER EFFICIENCY (BTU STEAM/BTU FUE		79.9%	79.0%	91.1%	73.4%
HEATING DEGREE DAY - ACTUAL (MAC)		918	1,030	395	58
COOLING DEGREE DAY - ACTUAL (MAC)		0	0	1	90
Chiller - New Central Plant		0	0	73	374
Run - Old Central Plant		0	0	0	0
Times - Chapel		0	0	0	3

1996-97 FUEL AND ELECTRICITY CONSUMPTION

		FEB.	MARCH	APRIL	MAY
GAS	QUANTITY-CCF	145,926	131,763	79,531	52,187
	COST-\$	\$41,494.11	\$25,949.29	\$16,174.57	\$12,108.04
	UNIT COST	0.284	0.197	0.203	0.232
	CCF BTUS(X1000)	14,592,600	13,176,300	7,953,100	5,218,700
#2 FUEL OIL	QUANTITY-GAL	0	0	0	0
	COST-\$	\$0.00	\$0.00	\$0.00	\$0.00
	UNIT COST	0.0000	0.0000	0.0000	0.0000
#6 FUEL OIL	QUANTITY-GAL	0	0	0	0
	COST-\$	\$0.00	\$0.00	\$0.00	\$0.00
	UNIT COST	0.0000	0.0000	0.0000	0.0000
	OIL BTUS(X1000)	0	0	0	0
TOTAL HEATING BTU (X100k)	QUANTITY-BTU(x1K)	14,592,600	13,176,300	7,953,100	5,218,700
ELECTRICITY	QUANTITY-KWH	1,135,139	1,036,800	972,000	1,072,800
	# BILLING DAYS	28	30	30	33
	KWH PER DAY	40,541	34,560	32,400	32,509
	COST-\$	\$47,543.95	\$44,095.82	\$46,660.08	\$46,988.51
	UNIT COST	0.042	0.043	0.048	0.044
	QUANTITY KW	1,896	1,920	2,256	1,896
	COST-\$	\$11,320.00	\$10,867.20	\$12,768.96	\$10,731.36
	BTUS(X1000)	3,873,094	3,537,562	3,316,464	3,660,394
TOTAL CAMPUS BTU CONSUMPTION X 10MIL		1,847	1,671	1,127	888
# STEAM GENERATED		12,502,300	11,992,000	9,173,200	6,796,700
BOILER EFFICIENCY (BTU STEAM/BTU FUE		78.2%	79.0%	76.0%	77.0%
HEATING DEGREE DAY - ACTUAL (MAC)		1,063	945	481	216
COOLING DEGREE DAY - ACTUAL (MAC)		0	0	0	35
Chiller - New Central Plant		0	0	0	123
Run - Old Central Plant		0	0	0	0
Times - Chapel		0	0	0	21

1997-98 FUEL & ELECTRICITY CONSUMPTION
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YTD TOTAL

GAS	QUANTITY-CCF	810,259
	COST-\$	\$220,834.41
	UNIT COST	0.273
	CCF BTUS(X1000)	81,025,900
#2 FUEL OIL	QUANTITY-GAL	0
	COST-\$	\$0.00
	UNIT COST	0.0000
#6 FUEL OIL	QUANTITY-GAL	9,246
	COST-\$	\$2,807.13
	UNIT COST	0.3036
	OIL BTUS(X1000)	1,386,900
TOTAL HEATING BTU (X100k)	QUANTITY-BTU(x1K)	82,412,800
ELECTRICITY	QUANTITY-KWH	12,782,400
	# BILLING DAYS	369
	KWH PER DAY	34,641
	COST-\$	\$613,893.99
	UNIT COST	0.048
	QUANTITY KW	26,808
	COST-\$	\$173,927.00
	BTUS(X1000)	43,613,549

<u>TOTAL CAMPUS BTU CONSUMPTION X 10MIL</u>	12,603
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# STEAM GENERATED	77,543,500
BOILER EFFICIENCY (BTU STEAM/BTU FUE	73.4%
HEATING DEGREE DAY - ACTUAL (MAC)	6,589
COOLING DEGREE DAY - ACTUAL (MAC)	88,888
Chiller - New Central Plant	2,495
Run - Old Central Plant	0
Times - Chapel	1,264

1996-97 FUEL AND ELECTRICITY CONSUMPTION
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YTD TOTAL

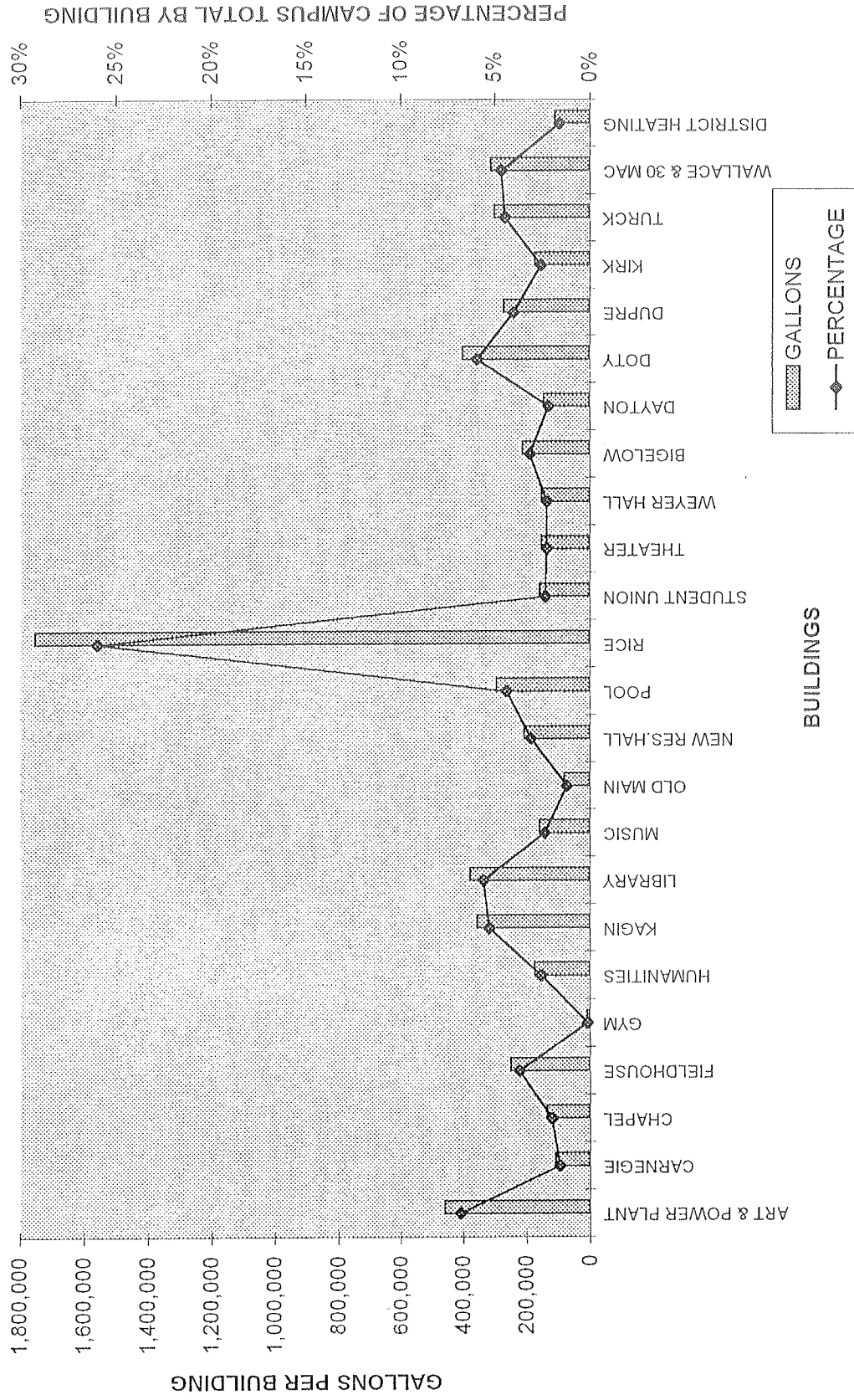
GAS	QUANTITY-CCF	731,656
	COST-\$	\$199,245.22
	UNIT COST	0.272
	CCF BTUS(X1000)	73,165,600
#2 FUEL OIL	QUANTITY-GAL	7,503
	COST-\$	\$5,605.12
	UNIT COST	0.7471
#6 FUEL OIL	QUANTITY-GAL	171,889
	COST-\$	\$88,295.93
	UNIT COST	\$0.51
	OIL BTUS(X1000)	26,826,267
TOTAL HEATING BTU (X100k)	QUANTITY-BTU(x1K)	99,991,867
ELECTRICITY	QUANTITY-KWH	11,983,679
	# BILLING DAYS	359
	KWH PER DAY	33,381
	COST-\$	\$559,179.31
	UNIT COST	\$0.05
	QUANTITY KW	24,648
	COST-\$	\$159,776.45
	BTUS(X1000)	40,888,313

<u>TOTAL CAMPUS BTU CONSUMPTION X 10MIL</u>	14,200
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# STEAM GENERATED	89,955,700
BOILER EFFICIENCY (BTU STEAM/BTU FUE	75%
HEATING DEGREE DAY - ACTUAL (MAC)	7,297
COOLING DEGREE DAY - ACTUAL (MAC)	1,112
Chiller - New Central Plant	123
Run - Old Central Plant	2,172
Times - Chapel	1,006

CONDENSATE

1997-98 CAMPUS CONDENSATE CONSUMPTION



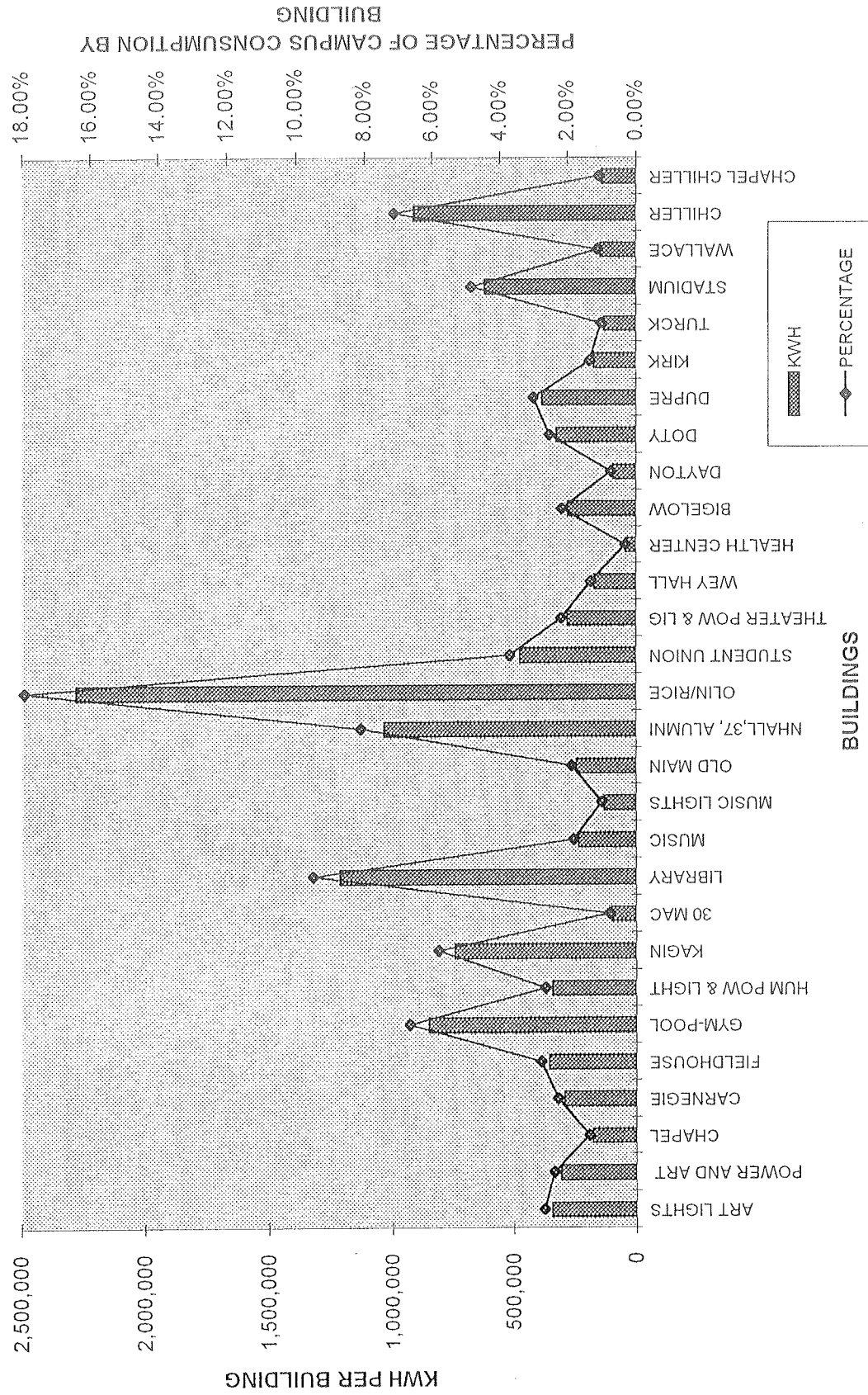
METER READINGS CONDENSATE PER BUILDING	JUN	JUL	AUG	SEP	OCT
MAY READING	READING	READING	READING	READING	READING
	UNITS	UNITS	UNITS	UNITS	UNITS
ART & POWER PLANT	0	0	0	0	0
CARNEGIE	0	0	0	0	0
CHAPEL	0	0	0	0	0
FIELHOUSE	0	0	0	0	0
GYM	0	0	0	0	0
HUMANITIES	0	0	0	0	0
KAGIN	0	0	0	0	0
LIBRARY	0	0	0	0	0
MUSIC	0	0	0	0	0
OLD MAIN	0	0	0	0	0
NEW RES.HALL	0	0	0	0	0
POOL	0	0	0	0	0
RICE	0	0	0	0	0
STUDENT UNION	0	0	0	0	0
THEATER	0	0	0	0	0
WEYER HALL	0	0	0	0	0
BIGELOW	0	0	0	0	0
DAYTON	0	0	0	0	0
DQTY	0	0	0	0	0
DUPRE	0	0	0	0	0
KIRK	0	0	0	0	0
TURCK	0	0	0	0	0
WALLACE & 30 MAC	0	0	0	0	0
DISTRICT HEATING	0	0	0	0	0

METER READINGS CONDENSATE PER BUILDING	NOV		DEC		JAN		FEB	
	12/3/97 READING	UNITS	1/7/98 READING	UNITS	2/3/98 READING	UNITS	3/4/98 READING	UNITS
ART & POWER PLANT	1,018,120	69,590	1,106,590	88,470	1,199,250	92,660	1,256,080	56,830
CARNEGIE	204,910	19,270	230,890	14,009	250,980	20,090	268,020	17,040
CHAPEL	1,459,810	19,682	1,459,850	25,582	1,468,820	31,267	1,476,790	20,394
FIELDHOUSE	4,263,020	42,050	4,317,520	54,500	4,365,030	47,510	4,403,250	38,220
GYM	128,850	1,420	130,970	2,120	132,770	1,800	133,740	970
HUMANITIES	3,416,400	26,880	3,451,010	34,610	3,487,110	36,100	3,509,890	22,780
KAGIN	881,360	50,382	913,010	64,361	921,530	60,192	929,350	57,430
LIBRARY	22,064,066	29,567	22,401,280	40,628	22,704,319	51,385	Estimated	32,748
MUSIC	3,282,640	1,630	3,315,780	33,140	3,352,940	37,150	3,388,540	35,500
OLD MAIN	289,610	16,550	314,180	2,960	332,340	18,160	346,610	14,270
NEW RES HALL	285,900	28,200	314,900	73,967	343,000	28,100	358,500	25,500
POOL	3,269,340	38,930	3,319,940	50,600	3,363,350	43,410	3,410,620	47,270
RICE	2,134,300	270,200	2,479,000	344,700	2,834,500	355,600	3,081,500	245,900
STUDENT UNION	696,010	24,410	725,720	29,710	749,920	24,200	773,530	23,610
THEATER	2,648,700	27,060	2,681,440	32,740	2,710,100	28,660	2,731,270	21,170
WEYER HALL	212,890	22,960	243,540	30,650	269,680	26,140	292,180	22,500
BIGELOW	283,160	29,320	329,500	45,340	365,910	36,410	396,850	30,940
DAYTON	642,290	26,348	643,410	22,224	609,930	27,208	643,830	33,900
DOTY	1,273,760	57,950	1,352,510	78,750	1,421,410	79,448	1,483,030	61,620
DUPRE	934,680	34,680	984,630	49,950	1,006,520	21,890	1,032,310	25,790
KIRK	3,662,230	27,944	3,668,640	40,583	3,659,180	32,197	3,669,270	32,197
TURCK	1,269,570	37,952	1,288,810	58,167	1,304,120	53,922	1,320,840	42,728
WALLACE & 30 MAC	4,307,740	49,840	4,357,990	50,250	4,388,900	40,910	4,443,080	44,180
DISTRICT HEATING	1,721,690	7,580	1,740,610	18,920	1,760,830	20,220	1,782,300	21,470
		960,375		1,287,931		1,214,639		976,057

METER READINGS CONDENSATE PER BUILDING	4/7/98 READING	MAR UNITS	5/7/98 READING	APR UNITS	6/2/98 READING	MAY UNITS	TOTAL	% USE PER BUILDING
ART & POWER PLANT	1,345,790	89,710	1,368,180	22,390	1,369,160	980	459,220	6.81%
CARNEGIE	286,620	18,600	293,620	7,000	294,140	520	107,789	1.60%
CHAPEL	1,494,700	17,910	1,501,490	6,790	1,501,700	210	134,496	1.99%
FIELDHOUSE	4,443,320	40,070	4,446,000	2,680	4,446,260	260	249,060	3.69%
GYM	134,750	1,010	134,750	0	134,750	0	7,810	0.12%
HUMANITIES	3,537,140	27,250	3,546,970	9,830	3,547,540	570	173,350	2.57%
KAGIN	942,890	26,300	971,080	28,190	976,350	5,270	355,715	5.27%
LIBRARY	15,610	27,865	35,810	20,200	36,760	950	378,014	5.61%
MUSIC	3,424,460	35,920	3,439,010	14,550	3,439,770	750	159,150	2.36%
OLD MAIN	364,460	17,850	368,280	3,820	368,320	40	80,550	1.19%
NEW RES. HALL	394,500	26,000	409,200	14,700	409,600	400	207,567	3.08%
POOL	3,462,600	51,980	3,491,420	28,820	3,494,290	2,870	294,430	4.37%
RICE	3,352,600	271,100	3,452,400	99,800	3,456,700	4,300	1,751,200	25.97%
STUDENT UNION	798,890	25,360	809,620	10,730	809,940	320	156,780	2.32%
THEATER	2,754,290	23,020	2,760,430	6,140	2,760,550	120	152,500	2.26%
WEYER HALL	318,150	25,970	327,460	9,310	327,690	230	152,270	2.26%
BIGELOW	431,690	34,840	446,910	15,220	447,300	390	212,020	3.14%
DAYTON	655,940	12,110	662,630	6,690	662,850	220	145,805	2.16%
DOTY	1,545,370	62,340	1,571,570	26,200	1,572,540	970	399,988	5.93%
DUPRE	1,110,320	78,010	1,144,700	34,380	1,145,630	930	270,440	4.01%
KIRK	3,669,540	25,172	3,679,950	10,420	3,680,180	220	173,163	2.57%
TURCK	1,339,290	43,235	1,353,030	40,497	1,353,410	380	300,141	4.45%
WALLACE & 30 MAC	4,489,700	45,620	4,527,710	38,010	4,528,690	980	312,820	4.64%
DISTRICT HEATING	1,806,880	24,580	1,815,720	8,840	1,816,160	440	109,770	1.63%
		1,052,822		465,207		22,330	6,744,048	1

ELECTRICITY

1997-98 CAMPUS ELECTRICAL CONSUMPTION



YEAR 1997-98 METER TYPE: ELECTRIC LOCATION	Read Date: JUNE	7/7/97 JUN TOTAL	Read Date: JULY	8/5/97 JUL TOTAL	Read Date: AUGUST	9/5/97 AUG TOTAL	Read Date: SEP	10/16/97 SEP TOTAL	Read Date: OCTOBER
ART LIGHTS	8978	24360	9984	20120	11147	23260	13040	37860	14248
POWER AND ART	57555	61740	58816	37830	59808	29760	60980	43890	61503
CHAPEL	74071	21030	74762	20730	75377	18450	76271	26820	76548
CARNEGIE	25003	16830	25660	19710	26142	14460	27158	30480	27729
FIELDHOUSE	27350	25800	28080	21300	28899	24570	30083	35520	30746
GYM-POOL	98057	76200	98591	53400	99223	63200	212	98900	796
HUM POW & LIGHT	61505	23100	62356	25530	63195	25170	64648	43590	65417
KAGIN	52288	53760	53356	64080	54405	62940	56291	113160	57052
30 MAC	24218	9030	24600	2865	25222	4665	28873	12382.5	27831
LIBRARY	7068	100160	7301	74560	7547	78720	8007	147200	8254
MUSIC	80031	14840	80742	14220	81740	19960	83118	27560	83834
MUSIC LIGHTS	85874	9000	86282	8160	86790	10160	87498	14160	87912
OLD MAIN	85724	15560	86405	13620	87072	13340	88305	24860	89000
NHALL, 37, ALUMNI	O	O	35222	35222	60262	25040	101957	41695	124764
OLIN/RICE	2418878	154183	2610988	192110	2825428	214440	3096474	271046	3243053
STUDENT UNION	26728	31960	27528	32000	28358	33200	29736	55120	30424
THEATER POW & LIG	91063	16420	91727	13280	92467	14800	94028	31220	95261
WEY HALL	64913	13340	65424	10220	66115	13820	67007	17840	67498
HEALTH CENTER	59600	3652.5	59862	1965	60252	2925	60551	2992.5	60857
BIGELOW	37460	15480	37724	15840	37965	14460	38406	26460	38678
DAYTON	84041	4065	84301	3900	84629	4920	85339	12150	85912
DOTY	32651	23250	33139	14640	33702	16890	35078	41280	35811
DUPRE	17800	19800	18150	14000	18637	13480	19982	53500	20730
KIRK	3999	2880	4026	4320	4056	4800	4174	18880	4259
TURCK	6762	6135	7226	6960	7646	6300	8313	18420	9472
STADIUM	76940	17800	77109	16900	77281	17200	77605	32400	78274
WALLACE	80541	5085	81432	6682.5	82592	8700	85125	18997.5	86512
CHILLER	312680	119300	532808	220128	734905	202097	954041	219136	962464
CHAPEL CHILLER	27493	33720	28814	62840	29773	969	30843	42800	30864
SUBTOTAL		919,981		1,017,733		988,686		1,560,420	
MAIN METER		940,800		979,200		1,008,000		1,135,200	
% OF MAIN METER		97.79%		103.94%		98.08%		137.46%	

YEAR 1997-98 METER TYPE: ELECTRIC LOCATION	11/05/97	Read Date:	12/05/97	Read Date:	1/7/98	Read Date:	2/3/98	Read Date:	3/4/98
	OCT TOTAL	NOVEMBER	NOV TOTAL	DECEMBER	DEC TOTAL	JANUARY	JAN TOTAL	FEBRUARY	FEB TOTAL
ART LIGHTS	24160	15857	32180	17606	34860	18905	26000	20663	35160
POWER AND ART	10460	62008	15150	62535	15810	62907	11160	63269	10860
CHAPEL	8310	76866	9540	77162	8880	77396	7020	77757	10830
CARNEGIE	17130	28508	23370	29380	26160	30055	29970	31017	28860
FIELDHOUSE	19890	31777	30930	33132	40650	34174	31260	35443	38070
GYM-POOL	58400	1492	69600	2303	81100	2950	64700	3725	77500
HUM POW & LIGHT	23070	66315	25940	67340	30750	68122	23460	69147	30750
KAGIN	45660	57962	54600	58907	56700	59771	51840	60825	58140
30 MAC	7185	28995	8730	30168	8797.5	31038	6525	32362	9930
LIBRARY	79040	8577	103360	8943	117120	9214	86720	9594	121600
MUSIC	14320	84708	17480	85553	16900	86485	18540	8717	24640
MUSIC LIGHTS	8280	88452	10800	89501	20980	89514	260	90154	12800
OLD MAIN	13900	90100	22000	91480	27600	92624	22880	93911	25740
NHALL 37, ALUMNI	22807	153889	28925	184525	30835	208072	23547	239060	30988
OLIN RICE	146579	3427492	184439	3639808	212316	3781997	142189	3964155	182158
STUDENT UNION	27520	31333	90900	32336	40120	33124	31520	34242	44720
THEATER POW & LIG	24660	96850	31780	98165	26300	99157	19840	590	28660
WEY HALL	9820	68159	13220	69023	17280	69719	13920	70535	16320
HEALTH CENTER	1545	61337	3600	62030	5197.5	62551	3907.5	63125	4305
BIGELOW	16320	39101	25380	39639	32280	40053	24840	40591	32280
DAYTON	7095	86501	8835	87081	8700	87462	5715	88159	10455
DOTY	21990	36683	26160	37640	28710	38315	20250	39381	31980
DUPRE	29920	21644	36580	22499	34200	23136	25480	24157	40840
KIRK	13600	4386	20320	4511	20000	4621	17600	4759	22080
TURCK	9795	10238	12240	11005	10755	11486	7215	12357	13065
STADIUM	66900	79119	84500	80099	98000	80975	87600	81704	72900
WALLACE	10402.5	88410	14235	90198	13410	91614	10620	93821	16552.5
CHILLER	8423	962464	0	962464	0	962464	0	962464	0
CHAPEL CHILLER	840	30889	1000	30923	1360	30937	560	30937	0
SUBTOTAL	748,022		1,006,774		1,065,872		815,239		1,032,184
MAIN METER	1,144,800		1,096,800		1,195,200		936,000		1,034,400
% OF MAIN METER	65.34%		91.79%		89.18%		87.10%		99.79%

YEAR 1997-98 METER TYPE: ELECTRIC LOCATION	Read Date: 4/7/98		Read Date: 5/7/98		Read Date: 6/1/98		ANNUAL TOTAL
	MARCH	MAR TOTAL	APRIL	APR TOTAL	MAY	MAY TOTAL	
ART LIGHTS	22521	30520	24405	37680	25126	14420	340,680 2.68%
POWER AND ART	63788	15570	64786	29940	65549	22890	305,060 2.40%
CHAPEL	78136	11370	78499	10890	78692	18935	172,805 1.36%
CARNEGIE	32018	30030	32927	27270	33311	25816	290,086 2.28%
FIELDHOUSE	36634	35730	37509	26250	38062	21937	352,507 2.77%
GYM-POOL	4540	81500	5310	77000	5772	46200	847,700 6.66%
HUM POW & LIGHT	70230	32490	71382	34560	71990	18240	337,650 2.65%
KAGIN	61872	62820	63206	80040	63784	34680	738,420 5.80%
30 MAC	33779	10627.5	35348	11757.5	36088	5400	97,905 0.77%
LIBRARY	9966	119040	10355	124480	10537	58240	1,210,240 9.51%
MUSIC	88971	25080	90230	25180	90818	14760	230,580 1.81%
MUSIC LIGHTS	90799	12900	91455	13120	91734	5580	126,200 0.99%
OLD MAIN	95243	26640	96289	20920	96810	10420	238,280 1.87%
NHALL, 37, ALUMNI	271863	32803	305466	33603	323668	728080	1,033,546 8.12%
OLIN/RICE	4176646	212491	4401885	225239	4542112	140227	2,277,417 17.90%
STUDENT UNION	35786	35337	36464	27120	37014	22000	471,517 3.71%
THEATER POW & LIG	1974	27680	3504	30600	4118	12280	277,520 2.18%
WEY HALL	71435	18000	72191	15120	72627	8720	167,620 1.32%
HEALTH CENTER	63744	4842.5	64084	2550	64367	2122.5	39,405 0.31%
BIGELOW	41155	33840	41621	27960	41801	10800	275,940 2.17%
DAYTON	88832	10095	89538	10580	89872	5010	91,530 0.72%
DOTY	40498	33510	41691	35790	42184	27600	322,050 2.53%
DUPRE	25214	42280	26391	47080	28849	18320	381,760 3.00%
KIRK	4901	22720	5013	17920	5042	4640	169,760 1.33%
TURCK	13225	13020	14246	15315	14774	7920	127,140 1.00%
STADIUM	82480	77600	82766	28600	82913	14700	615,100 4.83%
WALLACE	95882	15457.5	97995	15847.5	98777	5865	141,865 1.12%
CHILLER	962464	0	1048920	83	1185870	136950	906,617 7.13%
CHAPEL CHILLER	30937	0	30937	0	30967	1200	135,279 1.06%
SUBTOTAL		1,073,794		1,052,515		1,440,953	12,722,169 1
MAIN METER		1,161,600		1,039,200		1,111,200	12,782,400
% OF MAIN METER		92.44%		101.28%		129.68%	99.53%

MONTHLY ENERGY REPORT MAY, 1998	PREVIOUS YEAR ACTUAL	MONTHLY DATA		MONTHLY CURRENT MONTH ACTUAL	VARIANCE W/ BUDGET	MONTHLY BUDGET
		VARIANCE W/ PREV YR ACT	VARIANCE W/ BUDGET			
-Consumption (KWH)	1,072,800	38,400	22,800	1,111,200		1,134,000
-Cost	\$46,988.51	5,389.81	2,988	\$52,378.32		\$55,366.00
-Cost Per KWH	\$0.04380	\$0.00	0	\$0.04714		\$0.04900
-Demand(KW)	1,896	432	(312)	2,328		2,016
-Cost	\$10,731.36	\$2,445.12	(2,237)	\$13,176.48		\$10,939.88
-Cost Per KW	\$5.66	\$0.00	0	\$5.66		\$5.66
-# Of Billing Days	33	(1)	(2)	32		30
-Consumption Per Day (KWH)	32,509	2,216	3,075	34,725		37,800
FUEL OIL & GAS						
-Gas Consumption (CCF)	52,187	(35,932.00)	9,246	16,255		25,501
-Cost	\$12,108.04	(\$7,987.58)	863	\$4,120.46		\$4,983.56
-Cost Per CCF	\$0.2320	\$0.02	(0)	\$0.2535		\$0.1954
-Fuel Oil Consumption (Gallons)	0	0	0	0		0
-Cost	0	\$0.00	0	0		0
-Cost Per Gallon	0	\$0.00	0	0		0
-Total G&O BTU Consump (x100K)	52,187	(35,932)	9,246	16,255		25,501
-Total Cost Per BTU (x100K)	0	\$0.02	0	0		\$0.51
-Consumption Per Day BTU (x100K)	1,740	(1,198)	281	542		823
TOTAL ENERGY COST	\$59,096.55	(\$2,597.77)	3,851	\$56,498.78		\$60,349.56
ENERGY CONSUMPTION BTU (x100K)	88,791	(34,622)	10,024	54,169		64,193
HEATING DAYS	216	(158)	117	58		175
COOLING DAYS	35	55	(61)	90		29
ELECTRICITY	LAST YEAR YTD ACTUAL	MONTHLY DATA		CURRENT YTD ACTUAL	VARIANCE W/ YTD BUDGET	YTD BUDGET
		VARIANCE W/ LAST YEAR	VARIANCE W/ YTD BUDGET			
-Consumption KWH	11,983,679	798,721	(982,400)	12,782,400		11,800,000
-Cost	\$559,179.31	\$54,715.05	(35,694)	\$613,894.36		\$578,200.00
-Cost Per KWH	\$0.04697	\$0.0011	0	\$0.04803		\$0.04900
-Consumption KW	24,648	2,150	(4,248)	26,808		22,560
-Cost	\$159,776.45	\$14,151	(31,551)	\$173,927.28		\$142,376
-Cost Per KW	\$6.31128	\$0.00	(0)	\$6.31128		\$6.31
-# Of Billing Days	359	10	(4)	369		365
-Consumption Per Day (KWH)	33,381	1,260	(5,600)	34,641		29,041
FUEL OIL AND GAS						
-Total G&O BTU Consump (x100K)	999,991	(175,863)	325,872	824,128		1,150,000
-Total Cost Per BTU (x100K)	\$0.24	\$0.0266	(0)	\$0.27		\$0.26
-Consumption Per Day BTU (x100K)	2,785	(552)	917	2,233		3,151
TOTAL ENERGY COST	\$856,325	(18,789)	\$40,664	\$837,536		\$878,200
ENERGY CONSUMPTION BTU (x100K)	140,880	(20,250)	1,411,736	120,630		1,552,616
HEATING DAYS	7297	(708)	795	6,589		7384
COOLING DAYS	1112	422	189	690		859

MACALESTER COLLEGE
MONTHLY ENERGY BUDGET REPORT
JUNE 1997 - MAY 1998

ENERGY TYPE	QUANTITY CONSUMED	EXPENDITURE	BUDGETED CONSUMPTION (BTUs/KWH)	BUDGETED TOTAL EXPENDITURE	ESTIMATED TOTAL CONSUMPTION	ESTIMATED TOTAL EXPENDITURE
	6/1/97 5/31/98	6/1/97 5/31/98	6/1/97 5/31/98	6/1/97 5/31/98	6/1/97 5/31/98	6/1/97 5/31/98
GAS (CCF)	810,259	\$220,834.41				
OIL (GAL.)						
#6	9,246	\$2,807.13				
#2	0	\$0.00				
TOTAL BTUs (* 1,000)	82,412,800	\$223,641.54	115,000,000	\$300,000.00	82,412,800	\$223,642.00
ELEC. (KWH)	12,782,400	\$613,893.99	11,800,000	\$578,000.00	12,782,400	\$613,894.00
TOTAL EXPENDED	126,026,349	\$837,535.53	155,261,600	\$878,000.00	126,026,349	\$837,536.00

VARIANCE:
BUDGET VS EST \$40,464.00
=====

CONSUMPTION (\$85,010.09)
FUEL VARIANCE
PRICE \$8,652.09
SUB-TOTAL (\$76,358.00)

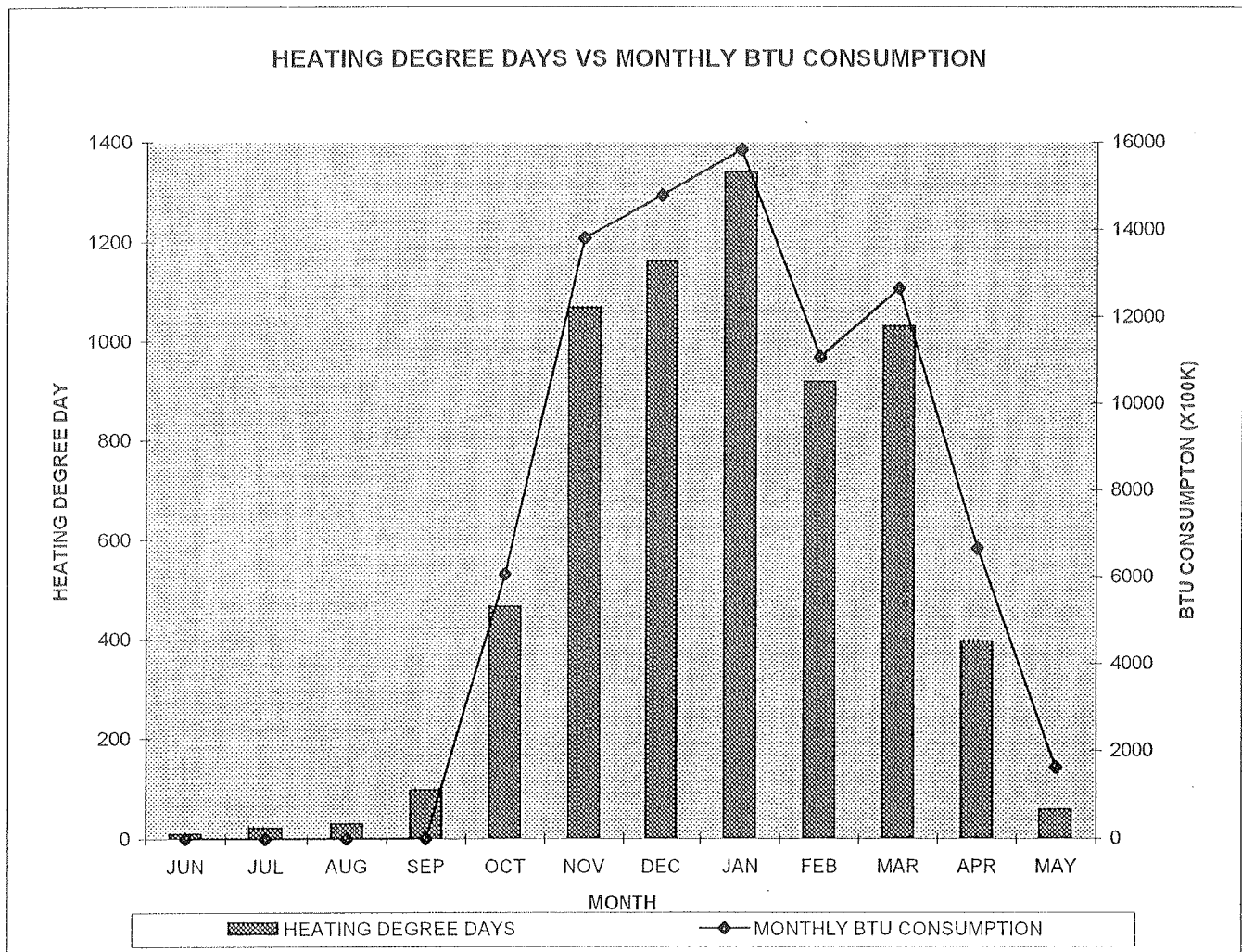
CONSUMPTION \$48,120.95
ELEC VARIANCE
PRICE (\$12,226.95)
SUB-TOTAL \$35,894.00

TOTAL FUEL AND
ELEC VARIANCE (\$40,464.00)
=====

STATISTICAL CORRELATION COEFFICIENT BETWEEN
HEATING DEGREE DAYS AND BTU CONSUMPTION
1997-98.

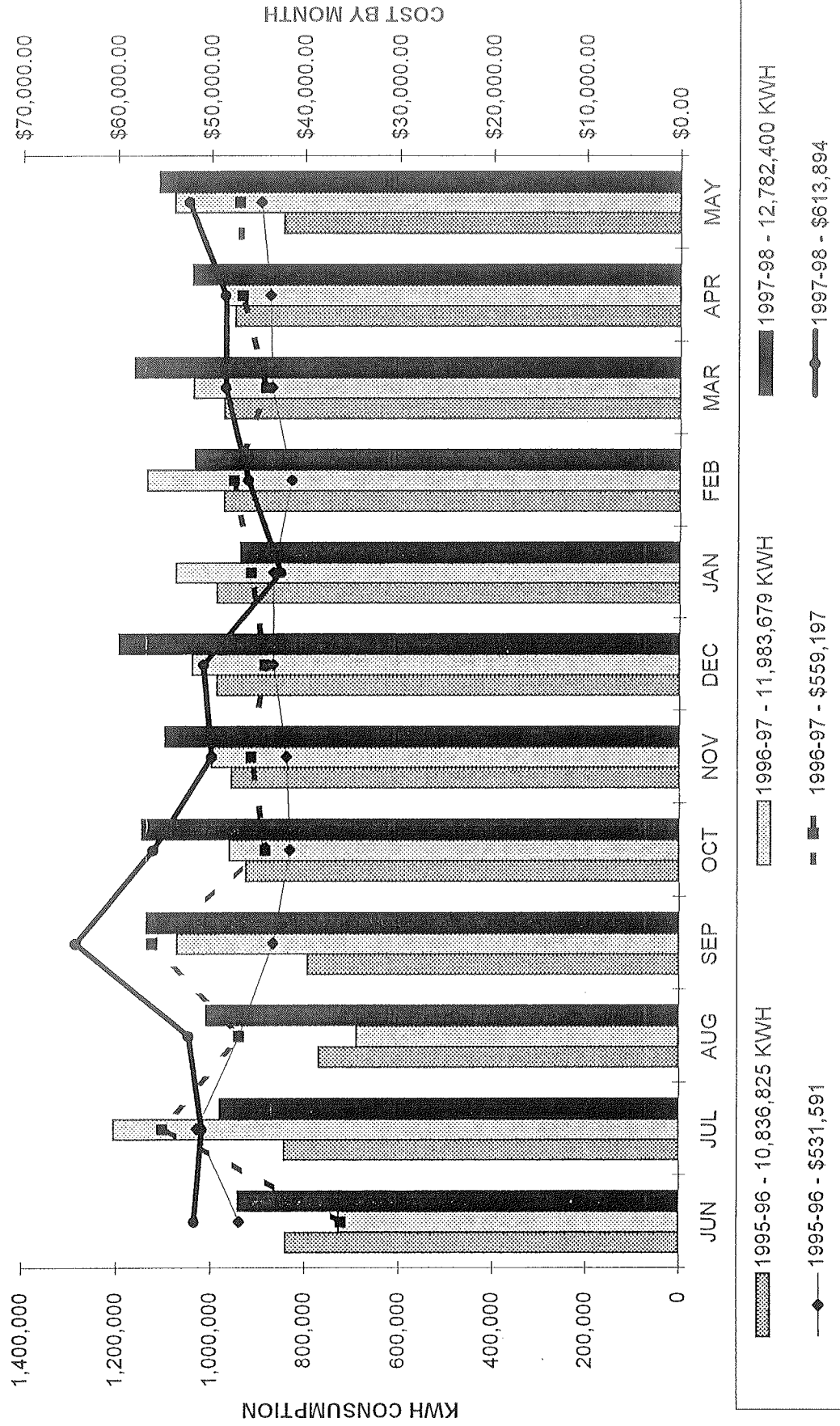
MONTH	DEGREE DAYS	
JUN	10	0
JUL	21	0
AUG	29	0
SEP	97	0
OCT	465	6058
NOV	1068	13793
DEC	1160	14767
JAN	1338	15811
FEB	918	11057
MAR	1030	12651
APR	395	6650
MAY	58	1626

CORRELATION 0.992584



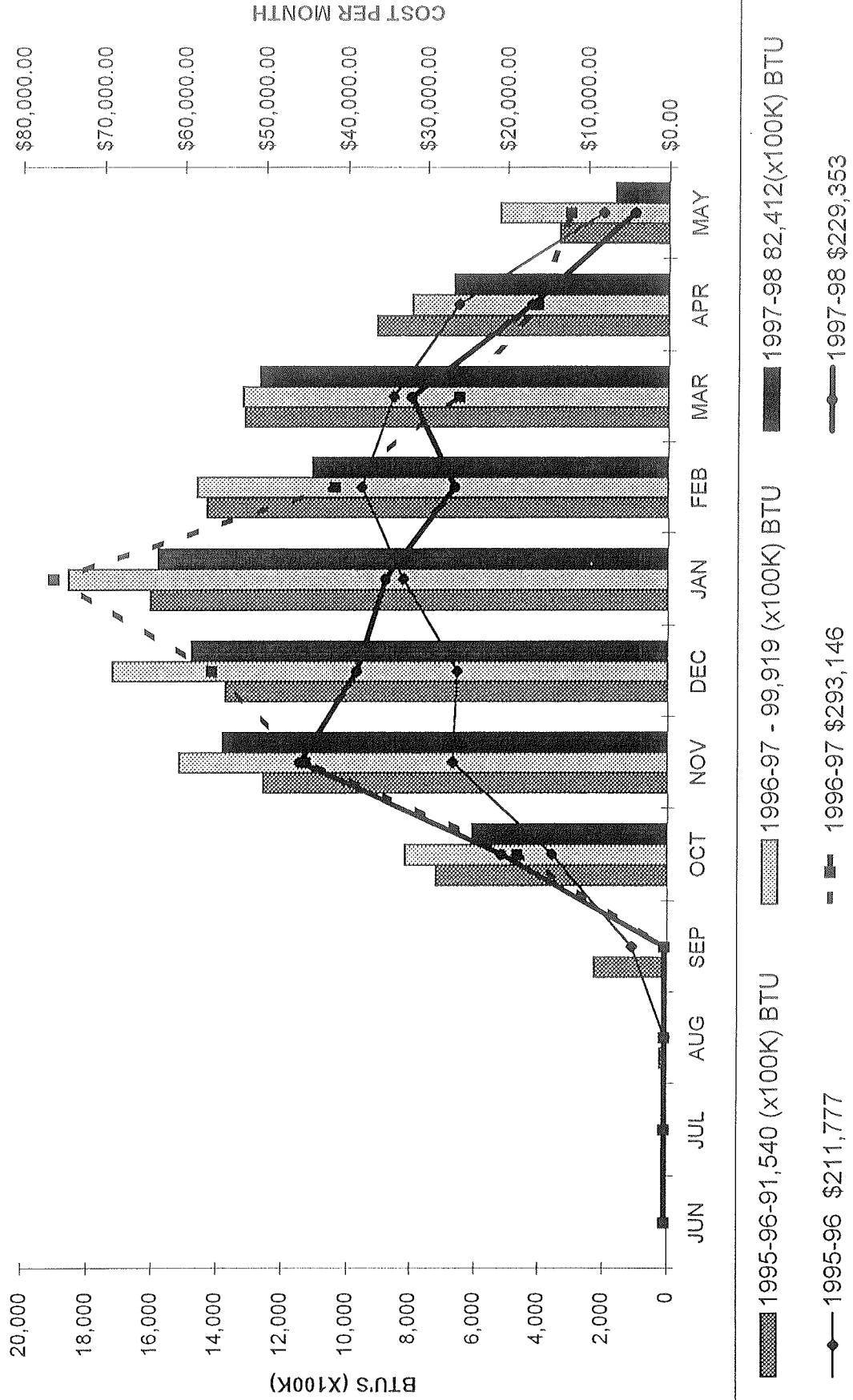
78-3ELECT

3 YEAR ELECTRIC COST/CONSUMPTION COMPARISON



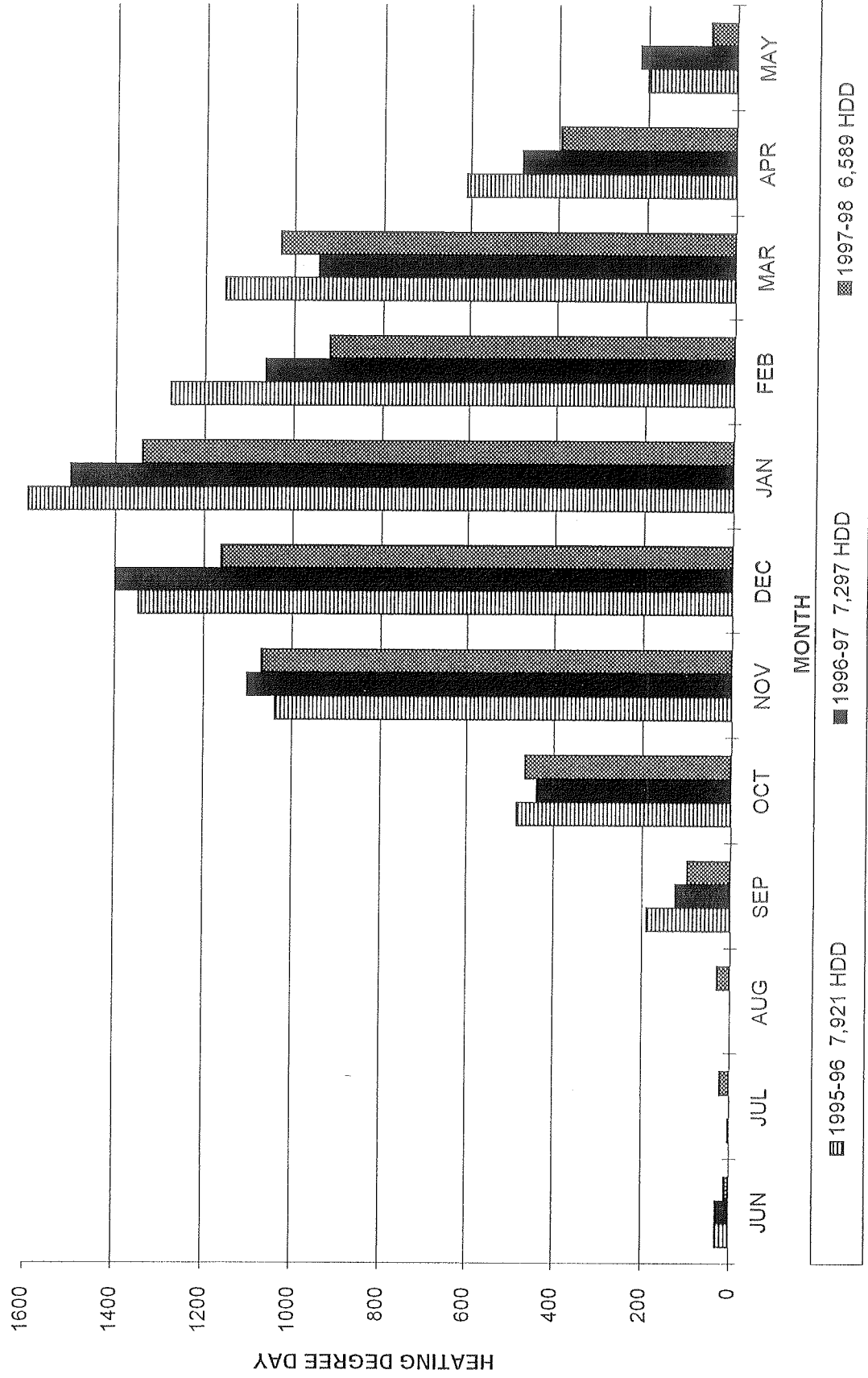
78-3FUEL

3 YEAR FUEL COST/CONSUMPTION COMPARISON



7-8 3YR HDD

3 YEAR HEATING DEGREE DAY COMPARISON



ENERGY CONSUMPTION
1984/85-1996/97

YEAR	ACTUAL HEATING DEGREE DAYS	BTUs CONSUMED x1,000,000	TOTAL FUEL COST	FUEL COST PER 100k BTU	KWH CONSUMED	TOTAL ELECTRIC COST	ELECT COST PER KWH	TOTAL SQUARE FEET	TOTAL BTU CONSUM (X1000k)	TOTAL BTU COST	BTU CONSUMP PER FOOT	COST per X1000K BTUs
84-85	7,632	100,514	\$401,058	0.3990	8,767,200	\$364,038	0.042	846,365	130,428	\$765,096	154,103	\$5.8661
85-86	7,852	91,852	\$328,917	0.3581	8,611,200	\$361,161	0.042	846,365	121,233	\$690,078	143,240	\$5.6921
86-87	6,238	86,956	\$186,058	0.2140	8,407,200	\$330,664	0.039	846,365	115,641	\$516,722	136,633	\$4.4683
87-88	7,138	98,071	\$235,637	0.2403	8,894,600	\$376,025	0.042	846,865	128,419	\$611,662	151,641	\$4.7630
88-89(1)	7,817	100,426	\$231,792	0.2308	9,900,000	\$418,470	0.042	846,365	134,205	\$650,262	158,566	\$4.8453
89-90(2)	8,181	99,062	\$232,017	0.2342	9,614,400	\$431,765	0.045	938,865	131,866	\$663,782	140,453	\$5.0337
90-91(3)	7,795	98,739	\$251,671	0.2549	10,459,200	\$473,973	0.044	944,865	134,426	\$714,724	142,270	\$5.3169
91-92	7,915	92,268	\$159,770	0.1732	10,699,200	\$473,973	0.044	944,865	128,774	\$633,743	136,288	\$4.9214
92-93(4)	7,296	95,977	\$165,834	0.1744	10,420,800	\$480,192	0.044	966,865	131,533	\$646,026	136,040	\$4.9115
93-94(5)	7,098	85,173	\$212,107	0.2231	10,384,173	\$487,722	0.047	972,865	120,604	\$699,829	123,968	\$5.8027
94-95	6,139	77,444	\$155,667	0.1637	10,454,200	\$509,883	0.049	972,865	113,140	\$665,550	116,296	\$5.8825
95-96(6)	7,921	91,589	\$211,776	0.2227	10,836,825	\$531,951	0.049	972,865	128,564	\$743,726	132,149	\$5.7849
96-97(7)	7,297	99,991	\$293,146	0.3083	11,983,679	\$559,179	0.049	1,018,615	140,880	\$852,326	139,404	\$5.8647
97-98(8)	6,589	82,412	\$223,642	0.2352	12,782,400	\$613,894	0.048	1,058,015	120,632	\$837,536	114,017	\$6.9429

1. Library built and on line.

2. Weyerhaeuser Hall renovated--a/c added.

3. Carnegie Hall renovated--a/c added along with more usable area.

4. Humanities renovated--additional space and a/c.

5. Old Main renovated--additional space and a/c.

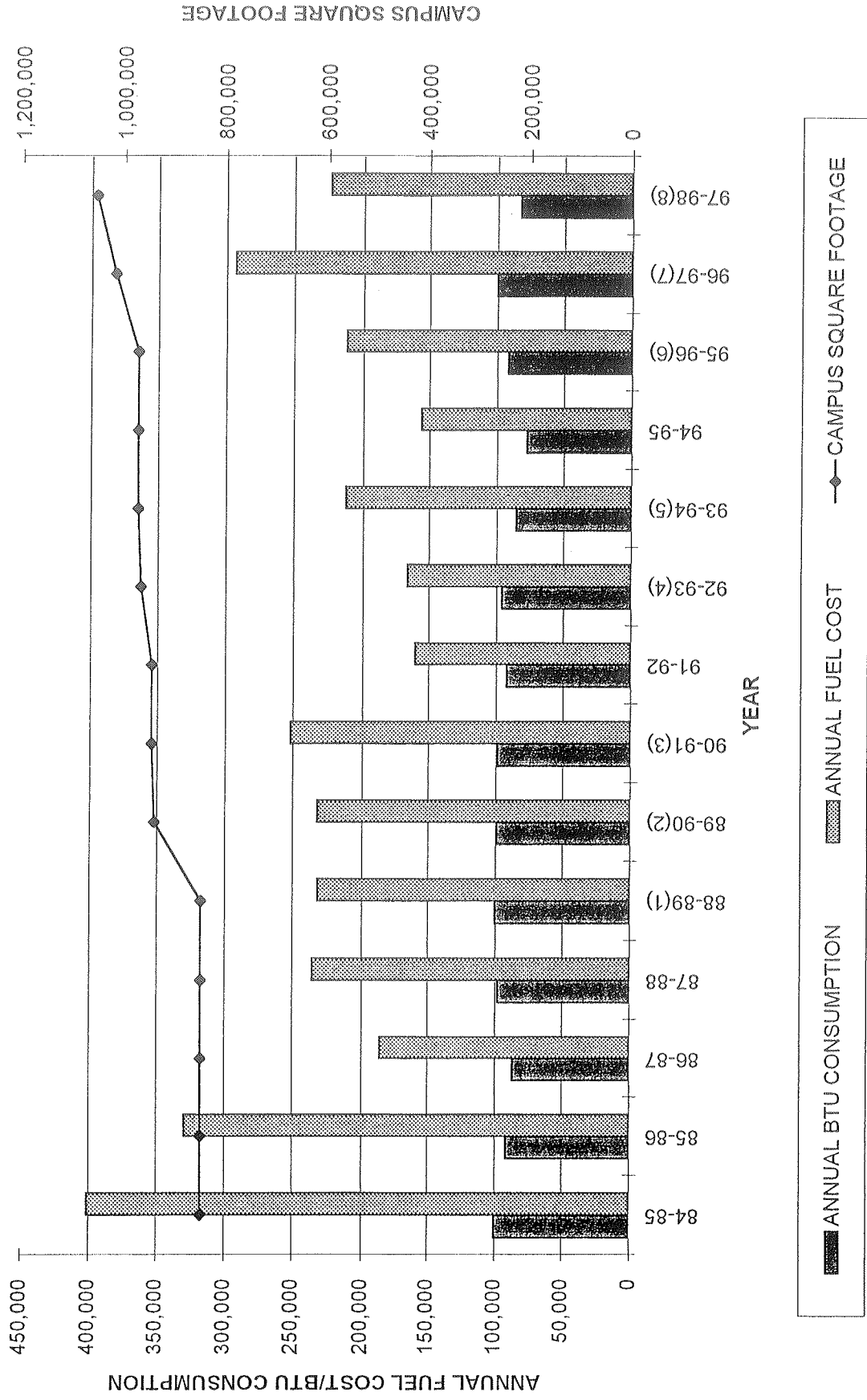
6. Rice renovation under way--construction heat throughout the year.

7. Rice operational with new mechanical systems, Olin's construction heat supplied by gas kiln meter--not reflected in this report.

8. New Residence Hall put on-line in August, 1997. Additional 39,400 square feet of area.

Chart4

ANNUAL FUEL TRENDS FOR CAMPUS



ANNUAL ELECTRICAL TRENDS FOR CAMPUS

